Radiation and Arctic at ECMWF

- model bias and radiation evaluation
- atmospheric composition and aerosol radiative forcing
- ECMWF participates in the WMO's YOPP. Special near real-time forecast outputs from the coupled model are available at specific grid-points including IASOA observation sites

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ECMWF

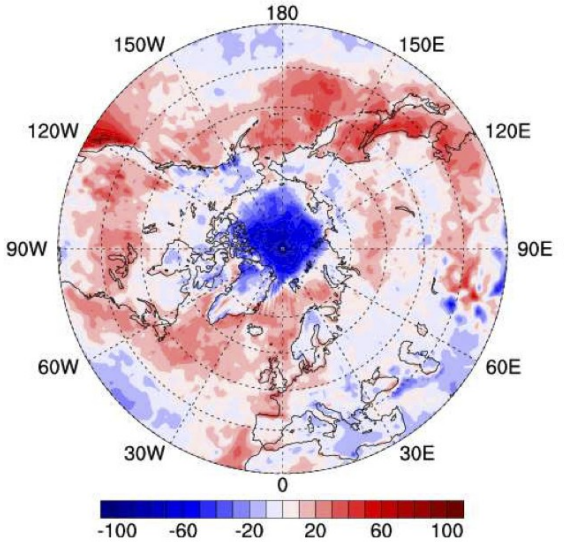
ECMWF and radiation in the Arctic model biases

- Overestimation of cloud cover and persistence of low clouds layers as suggested by comparison with estimates from CALIPSO
- Challenges in modeling mixed-phase clouds (some improvements from ERAi to ERA5)
- Possible contribution of errors in surface albedo (e.g. melt ponds)

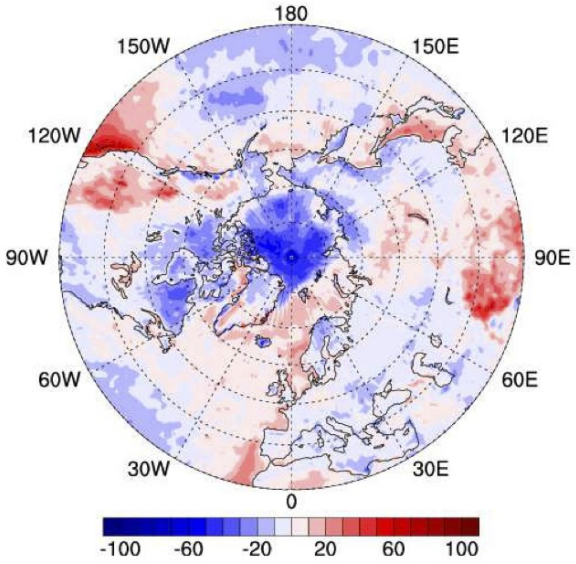
- Useful observations
  - Clouds and radiation measurements to separate clear-sky and cloudy conditions (e.g. cloud forcing dataset)
  - Any seasonal observation off the coasts into the Arctic Ocean?
  - **Extra**: spectral radiation observations, perhaps also in the far infrared (to study biases in the LW continuum or errors in surface emissivity assumptions)

ECMWF

Surface short-wave downwelling flux anomaly
(W/m^2, CERES estimate)



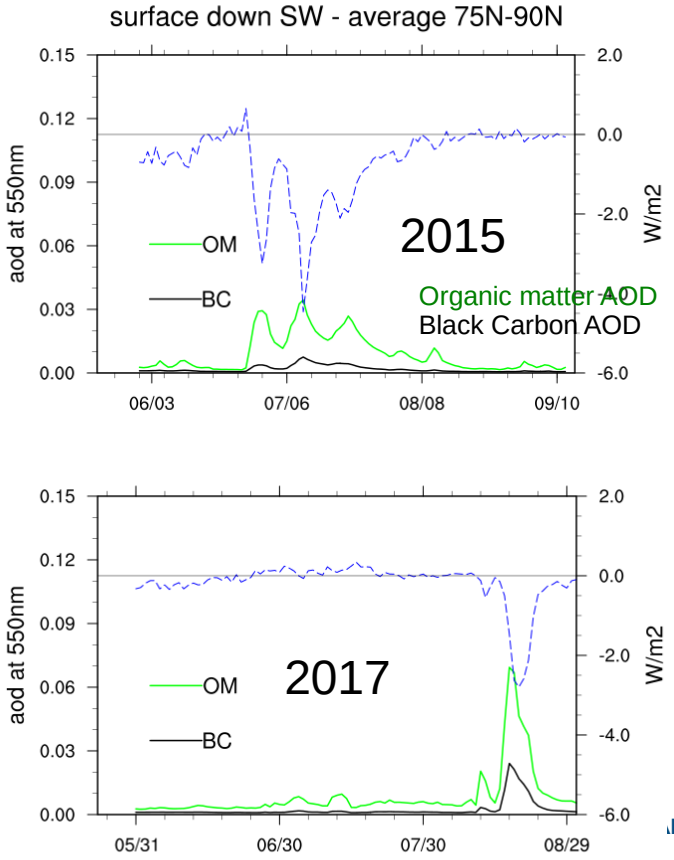
ERA-i

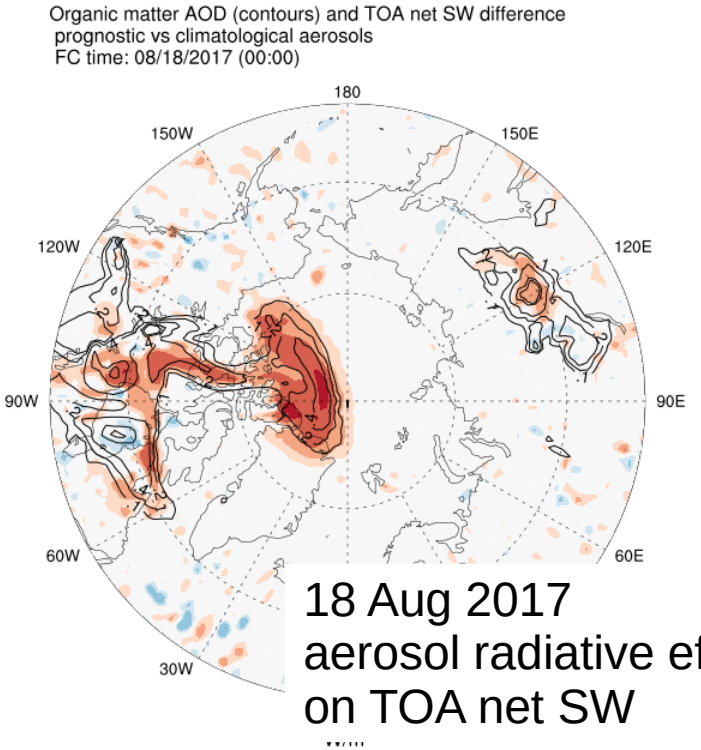


ERA5

ECMWF and radiation in the Arctic aerosol radiative forcing

- ECMWF runs CAMS (former MACC, former GEMS) to monitor and forecast the atmospheric composition. We've been looking at the impact of aerosol from forest fires in the Arctic in the past few summer seasons
- Co-located radiative observations and aerosol concentration/optical thickness could help the validation of CAMS aerosol product and the radiative impact simulated by the model.





18 Aug 2017
aerosol radiative effect on TOA net SW